

Innovative Service Design



Kai Monast

Institute for Transportation Research and Education

kmonast@ncsu.edu (919) 515-8768

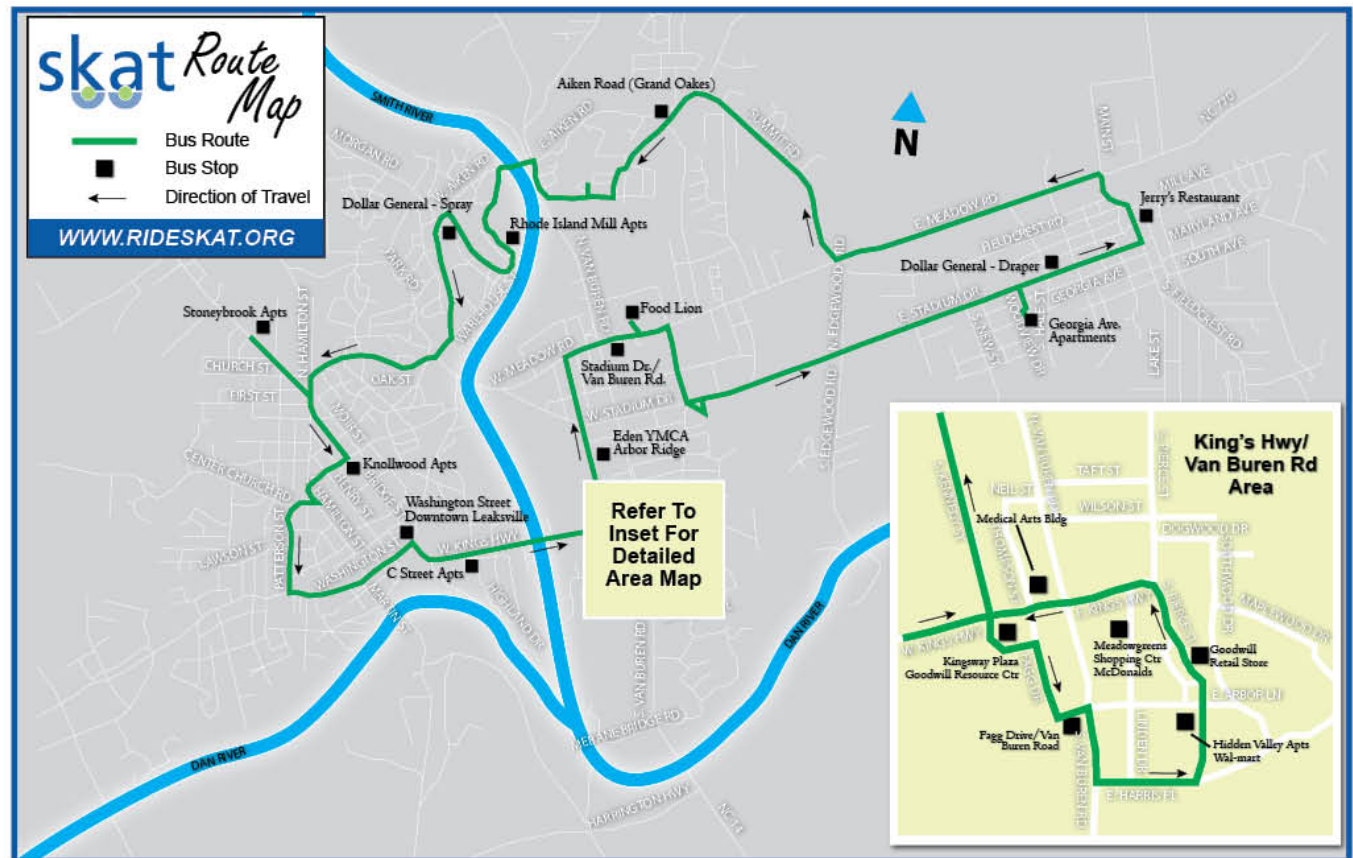
Why This? Why Now?

- Funds could be reduced or eliminated any time
 - Government shutdown
- Mobility needs are increasing
- Rethink what we do and how we do it
 - Effective use of scarce resources

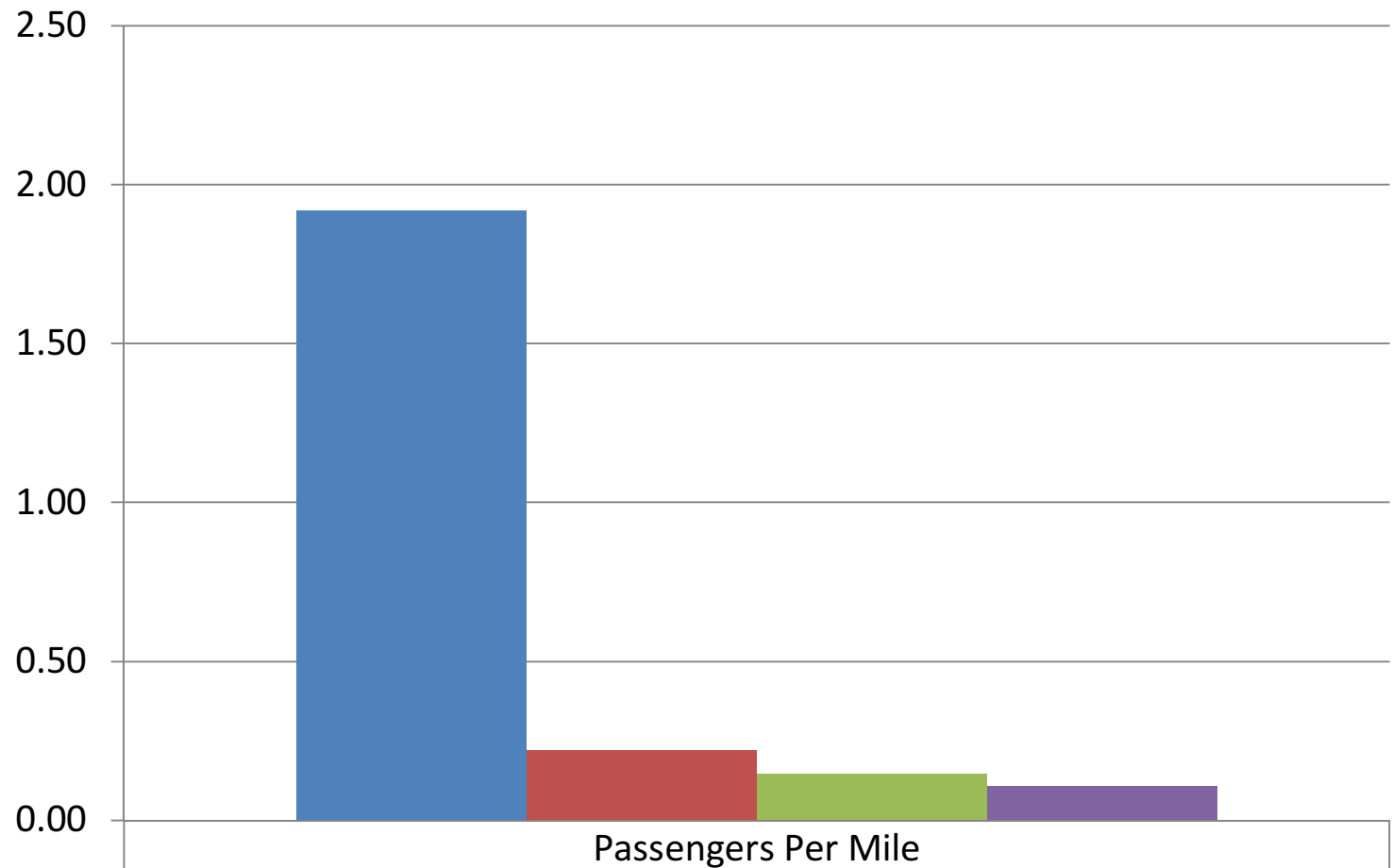


Service Design Motivators

- Coverage / Mobility
- Efficient / Cost Effective
- Politics
- Charity

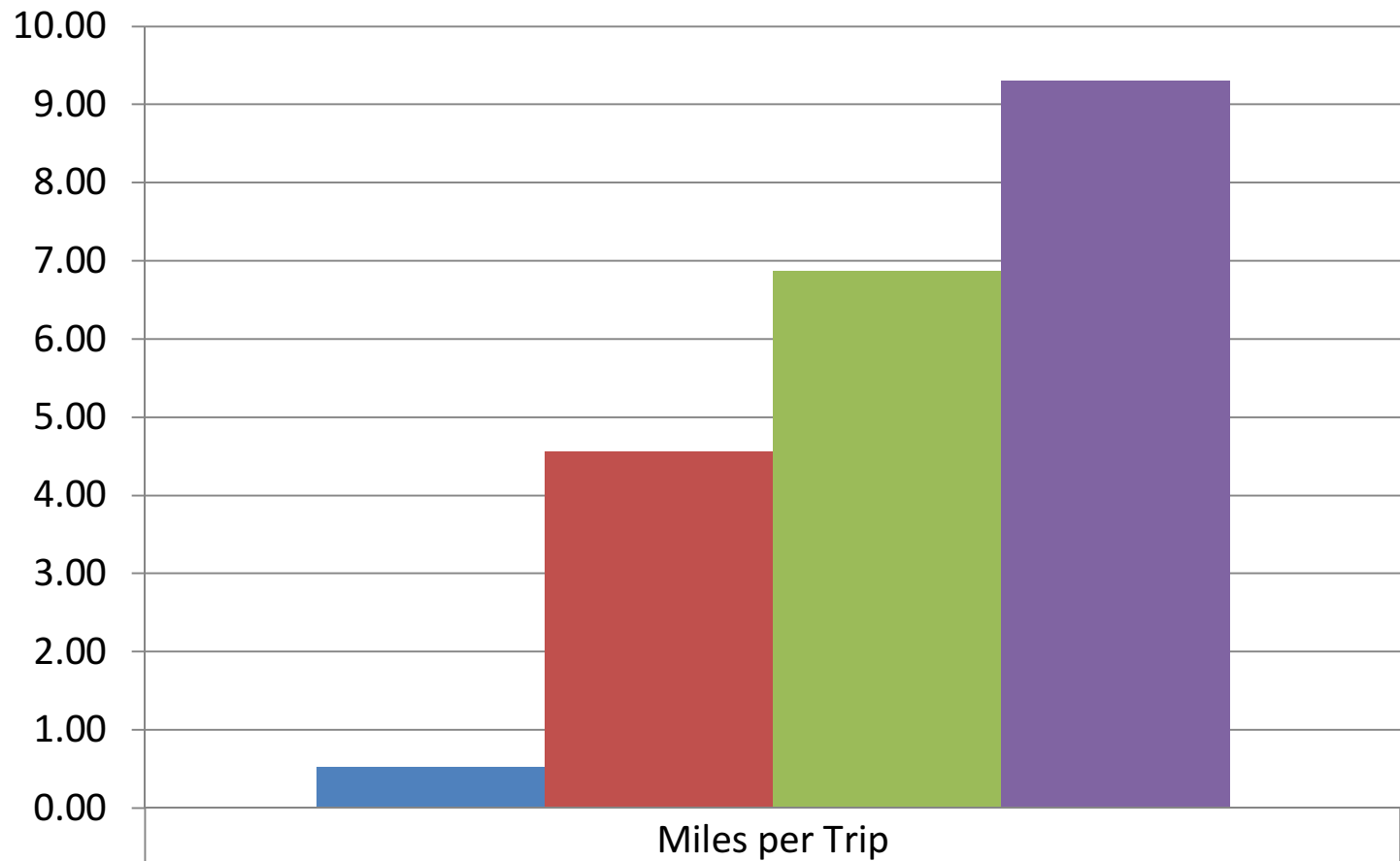


FY13 NC Passengers Per Mile (CT Systems)



Fixed Route	1.92
Deviated Fixed Route	0.22
Taxi/Broker	0.15
Demand Response	0.11

FY13 NC Miles Per Trip (CT Systems)



Fixed Route	0.52
Deviated Fixed Route	4.56
Taxi/Broker	6.87
Demand Response	9.31

Average Trip Costs by Service Type

Service Type	Cost at \$1.60/mile
Fixed Route	\$0.83
Deviated Fixed Route	\$7.30
Taxi/Broker	\$10.99
Demand Response	\$14.89

Demand Response

A transit mode comprised of passenger cars, vans or small buses operating in response to calls from passengers or their agents to the transit operator, who then dispatches a vehicle to pick up the passengers and transport them to their destinations.

re·sponse [ri-spons]

Noun

1.an answer or reply, as in words or in some action

de·mand [dih-mand, mahnd]

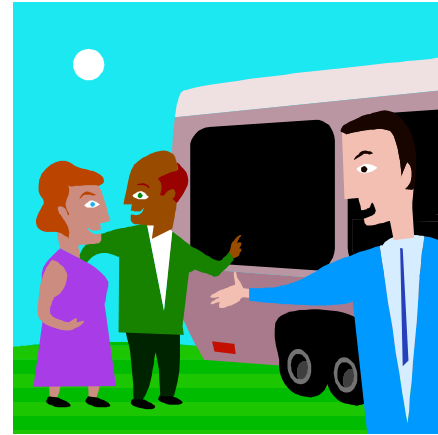
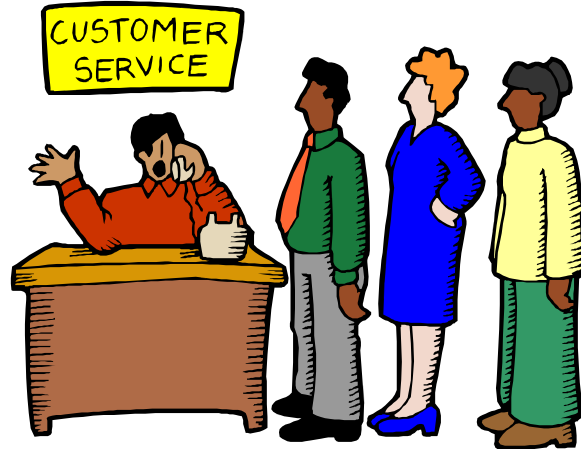
verb (used with object)

1. to ask for with proper authority; claim as a right
2. to ask for peremptorily or urgently:
3. to call for or require as just, proper, or necessary:

verb (used without object)

1. to make a demand; inquire; ask.

1. They ASK



2. You REPLY

3. You both AGREE



Where/When is Demand Response Appropriate

- It is not cost-effective to provide any other kind of service (**LAST RESORT!**)
- Origins/destinations are far apart from one another (i.e. no “clusters”)
- Passenger pickup/drop off times are spread apart **and the transit system never developed a structure to consolidate them**

What Good is Demand Response?

2. High value to agency services -

These are needed where services are tailored to particular needs of public agencies. These include some patient transport, school transport, joblink services.

1. Premium value services -

These high value services are defined by the need to reduce travel times, receive a higher degree of customer care and are often door-to-door. These have grown significantly for niche markets such as airport transfer services.

3. High care needs - This market is quite diverse to cater for the different care needs of travellers. It includes services for people with disabilities such as dial-a-ride and some non emergency patient transport, social services transport, and community transport.

4. Best value - Where demand is low, greater flexibility in the locations for picking up and dropping off passengers can ensure better value and wider network coverage.

Expectations

- Stop thinking **Demand**, start thinking **Request**
- Begin moving away from Demand Response
 - Introduce new service designs





Tools



- Premium Pricing
 - Charge higher rates to trips outside of your efficient structure
- Change Billing
 - Move away from shared miles/hours to a method that rewards efficiency (flat rate, zone, taxi miles)
 - Added benefit- agencies know how much trips costs beforehand



Tools



- Stop Billing
 - Sell passes/cards to agencies
 - Get \$ upfront
 - Helps with cashflow
 - Takes you out of the trip eligibility determination process
 - Frees office time to perform service planning



Tools



- Negotiate Times
 - Negotiate with customers to adjust requested times
 - Reservation taker must know what times work best for each area
 - Best if there is a schedule that is shared with the customers and agencies



Tools



- Zones
 - Divide the service area into zones that are served at scheduled intervals
 - Publish and distribute the maps and schedules
 - Customers request the run/time they want
 - The scheduling problem is simplified!



Tools



- Point Deviation Routes
 - Have demand response routes stop at popular destinations at scheduled intervals
- Blended Service
 - Vehicle provides demand response service in some areas and fixed route/deviated route service in other areas
 - Easy and affordable way to create fixed route/deviated route service without adding vehicles/drivers



Tools



- Schedule Out of Area Service
 - Create a schedule of when you will serve out of area destinations
 - Publish the schedule and distribute to your customers and agencies
- Coordinate Out of Area Service
 - Work with other CT providers to establish out of area schedules

Putting it into Practice

- Don't deny, negotiate
- Create a structure
- Provide info
 - Schedules
 - Maps
- Simplify



The background of the slide is a topographic map. It features brown contour lines of varying thicknesses, representing different elevations. The map is overlaid with a fine grid of small squares, typical of a coordinate system used in cartography. The colors are primarily shades of brown and tan, with some darker brown lines for the contours.

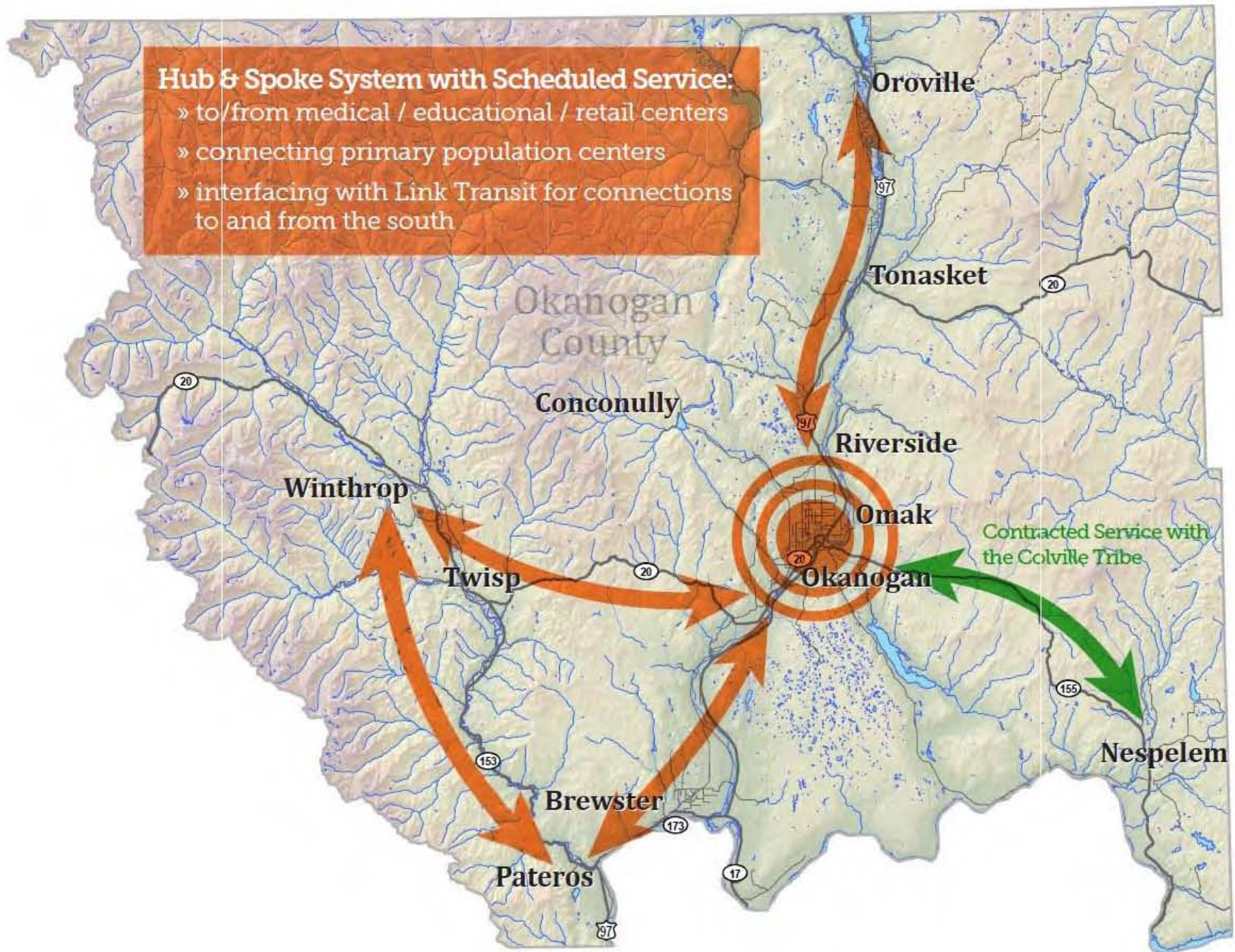
Conceptual Maps

Network Map of Travel Demand



Hub & Spoke System with Scheduled Service:

- » to/from medical / educational / retail centers
- » connecting primary population centers
- » interfacing with Link Transit for connections to and from the south

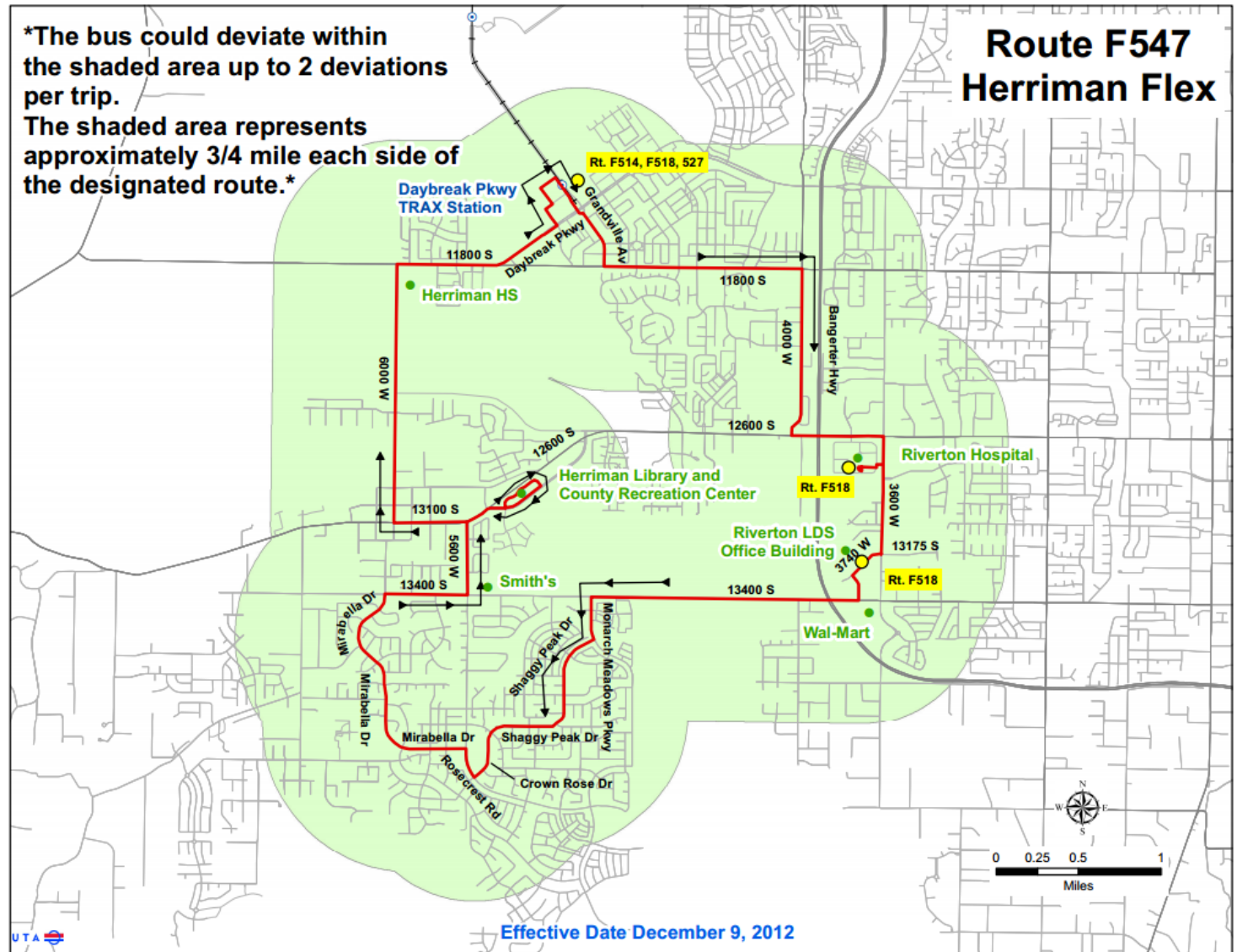


Real World Examples



UTA- Salt Lake City

- Circulator
- $\frac{3}{4}$ mile deviation area
- 2 deviations per run (loop)



<http://www.rideuta.com/mc/?page=Bus-BusHome-RouteF547>

Cape Cod

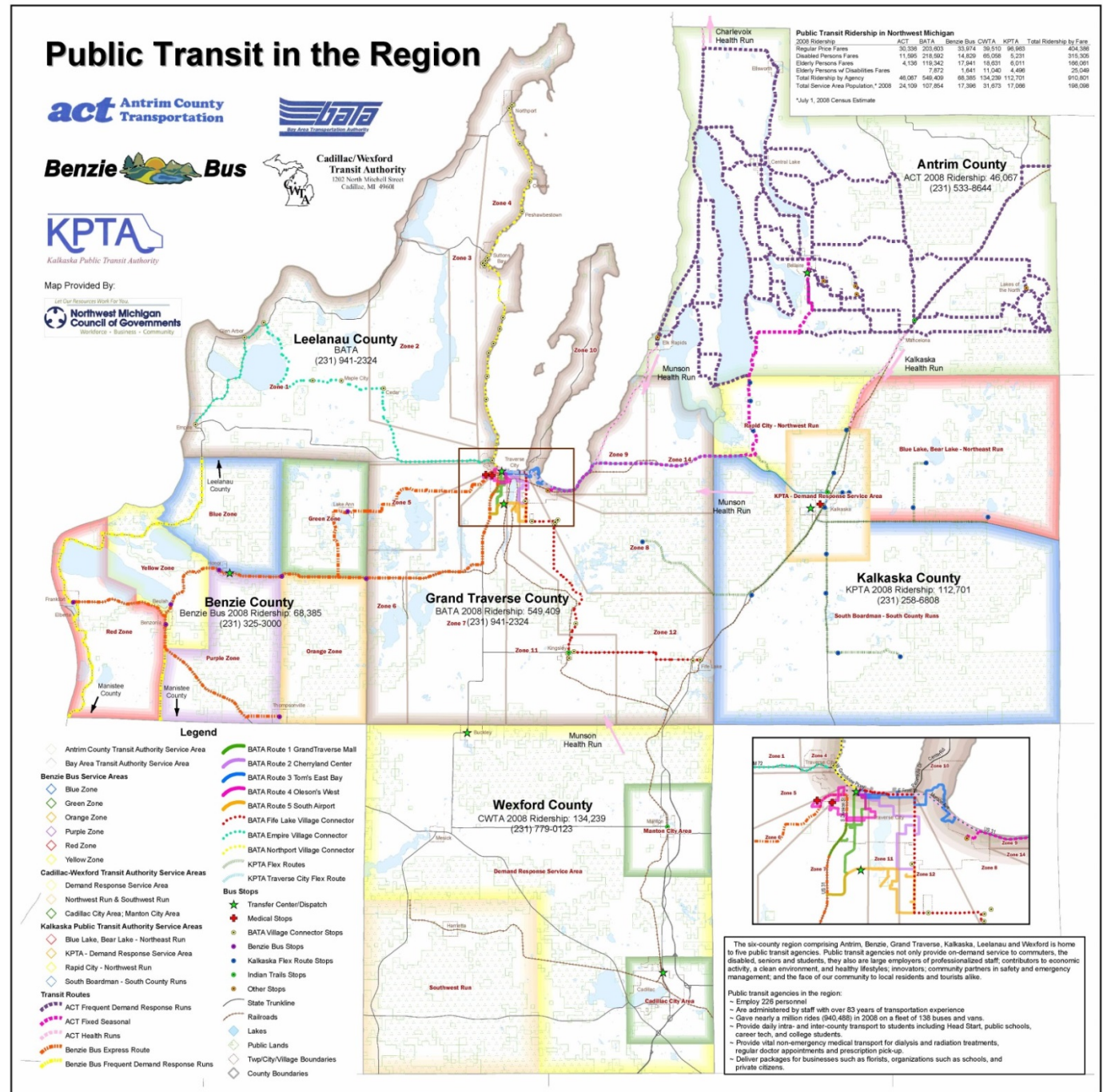
- Technology integration
- Scheduled school stops when needed
- Request stops

NextBus Stop# ***	#	Departs	AM	PM
45	2	STAR MARKET, HARWICH	-- 7:30 9:30	12:30 1:30 2:30 5:30
46	2	Route 28, Harwich Port	--	
56		Harwich Community Center	--	
57		STOP & SHOP, EAST HARWICH	-- 7:50 9:50	12:50 1:50 2:50 5:50
59		Lighthouse Charter School	--	3:00
60		Underpass Road	--	
61		BREWSTER SR. HOUSING/COA	-- 8:10 10:10	1:10 2:10 3:10 6:10
53	2	Skaket Corners, Orleans	--	
51	1, 2	Land Ho	--	
55	2	STOP & SHOP, ORLEANS	6:30 8:30 10:30	1:30 2:30 3:30 6:30
62	1	Eastham Town Hall	6:34 8:34 10:34	1:34 2:34 3:34 6:34
64		SALT POND VISITORS CENTER	6:45 8:45 10:45	1:45 2:45 3:45 6:45
65		Four Points		
143		Bracket Road @ Rte. 6	REQ REQ REQ	2:50 3:50 REQ
77		Nauset Regional High School		
68	1	BLACKFISH VARIETY	7:00 9:00 11:00 2:00	3:00 4:00 7:00



Northwest Michigan

- Regional connections
- Local circulation
- Feeder Zones
- Deviated Routes
- Urban Fixed Routes
- Demand Response Areas

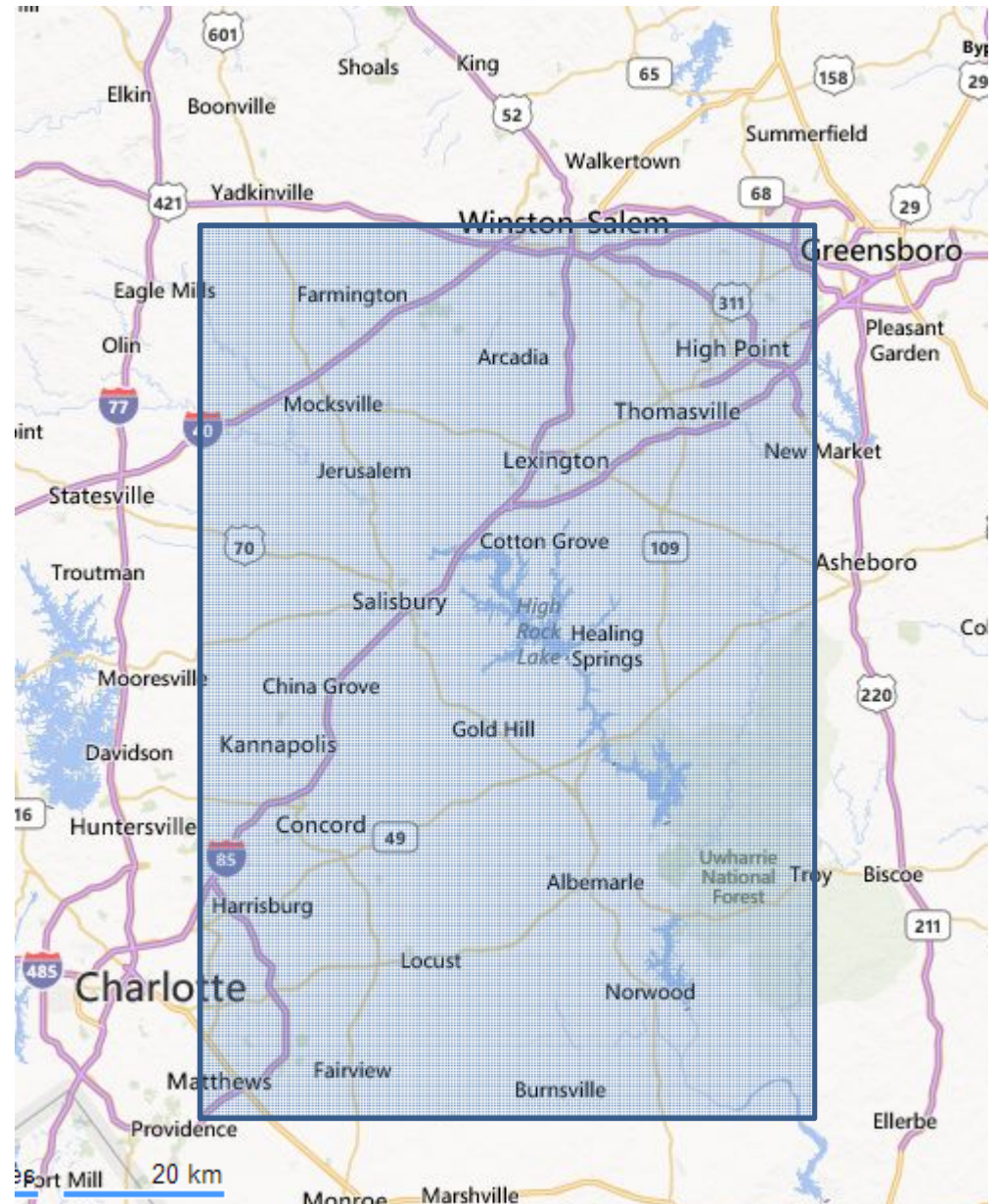


~ 4000 miles²

- I-77 to US 220/I-74

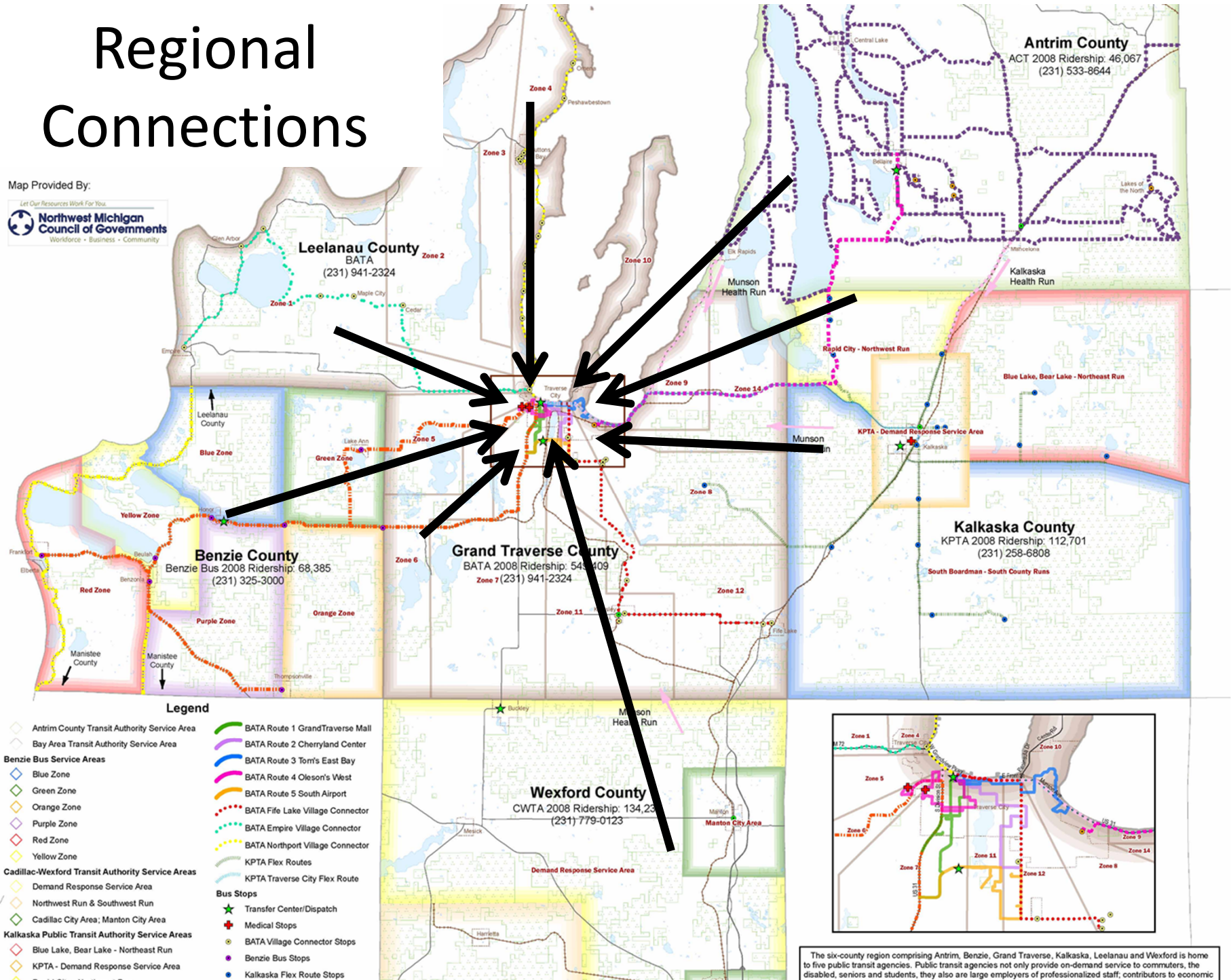
- I-40 to US 74

- | | |
|----------------|----------------|
| 1. Mecklenburg | 10. RCATS |
| 2. Charlotte | 11. Iredell |
| 3. CK Rider | 12. WSTA |
| 4. Cabarrus | 13. Greensboro |
| 5. Salisbury | 14. Guilford |
| 6. Rowan | 15. Davidson |
| 7. Stanly | 16. High Point |
| 8. Union | 17. YVEDDI |
| 9. Anson | 18. PART |



Regional Connections

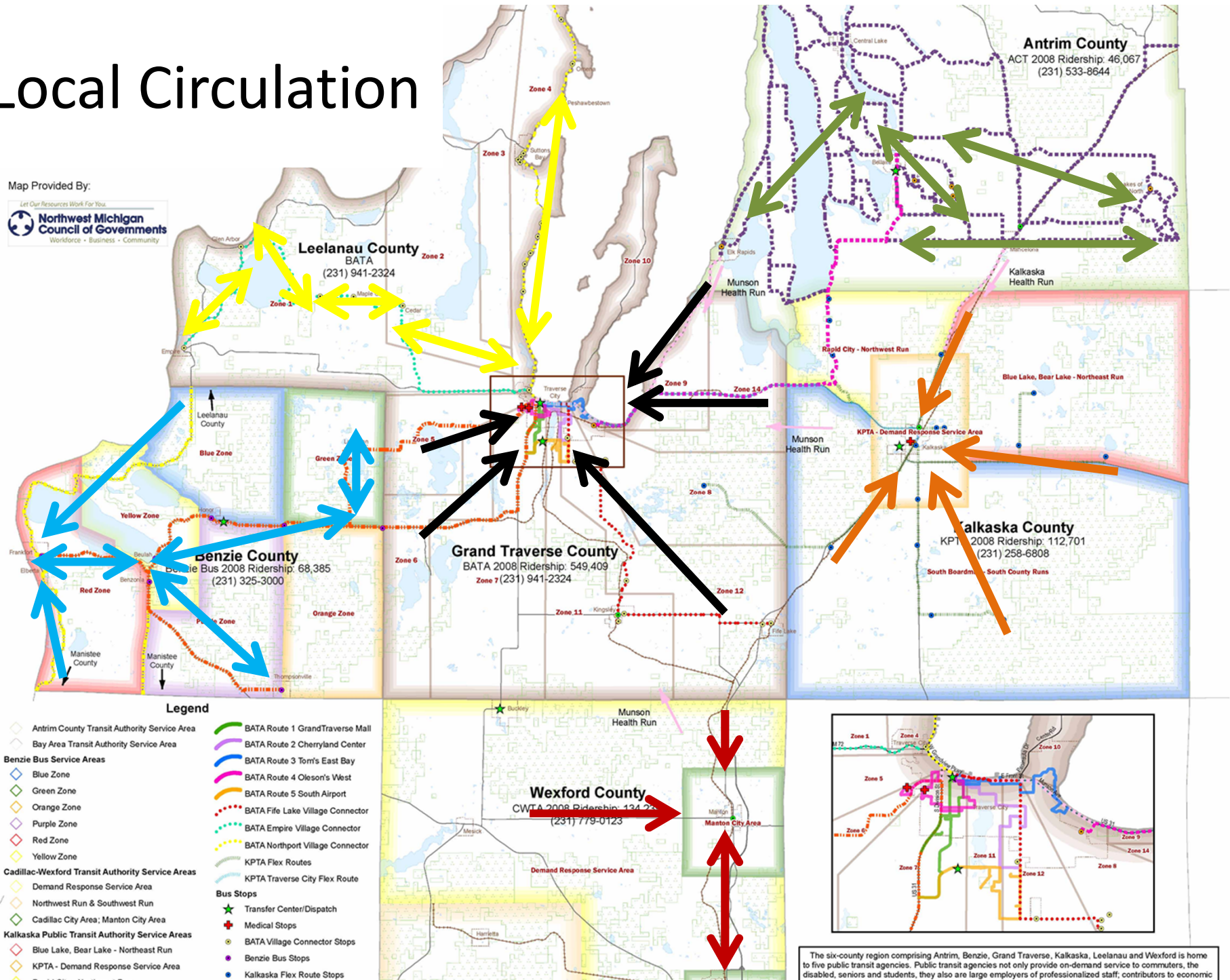
Map Provided By:



The six-county region comprising Antrim, Benzie, Grand Traverse, Kalkaska, Leelanau and Wexford is home to five public transit agencies. Public transit agencies not only provide on-demand service to commuters, the disabled, seniors and students, they also are large employers of professionalized staff; contributors to economic

Local Circulation

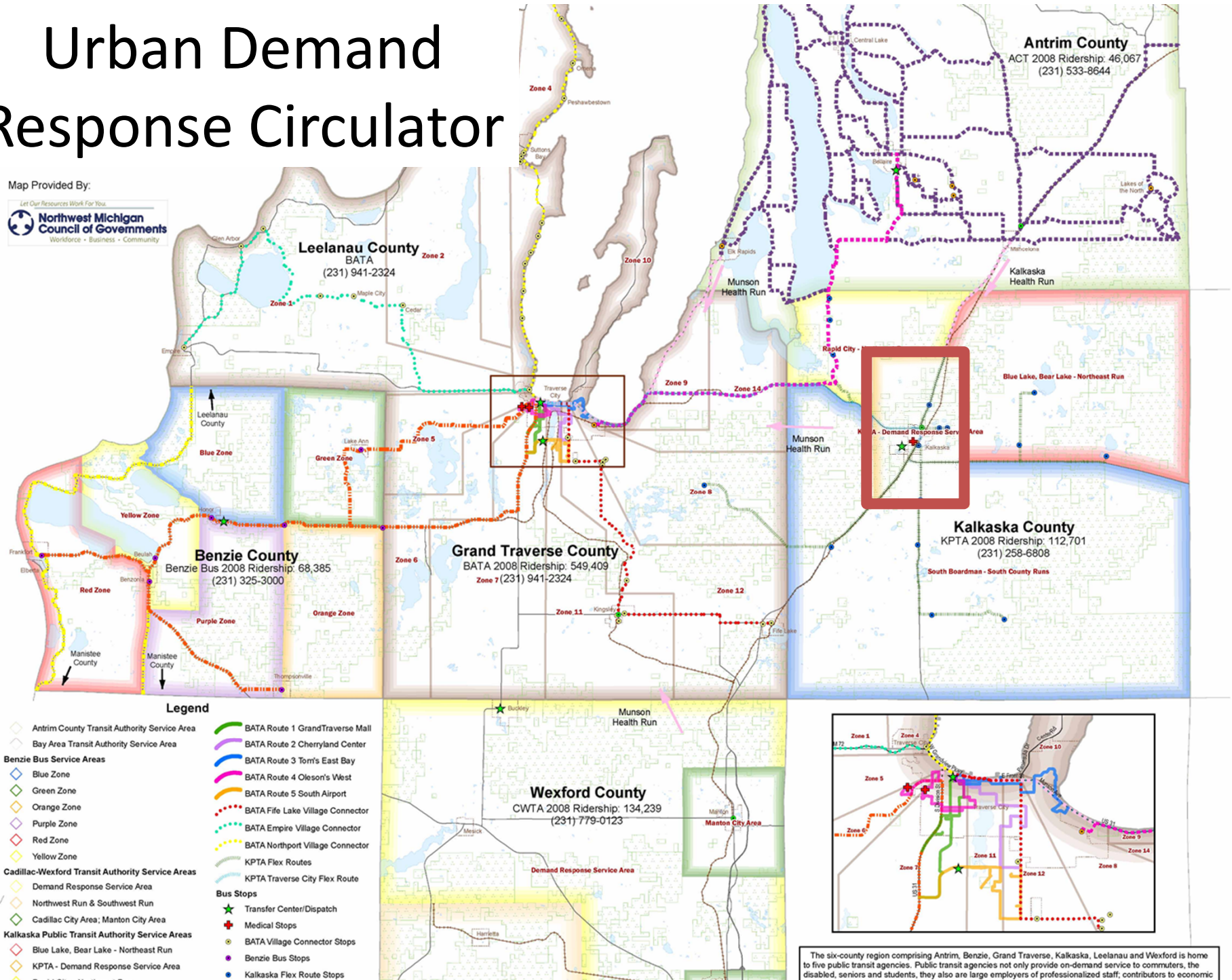
Map Provided By:



The six-county region comprising Antrim, Benzie, Grand Traverse, Kalkaska, Leelanau and Wexford is home to five public transit agencies. Public transit agencies not only provide on-demand service to commuters, the disabled, seniors and students, they also are large employers of professionalized staff; contributors to economic

Urban Demand Response Circulator

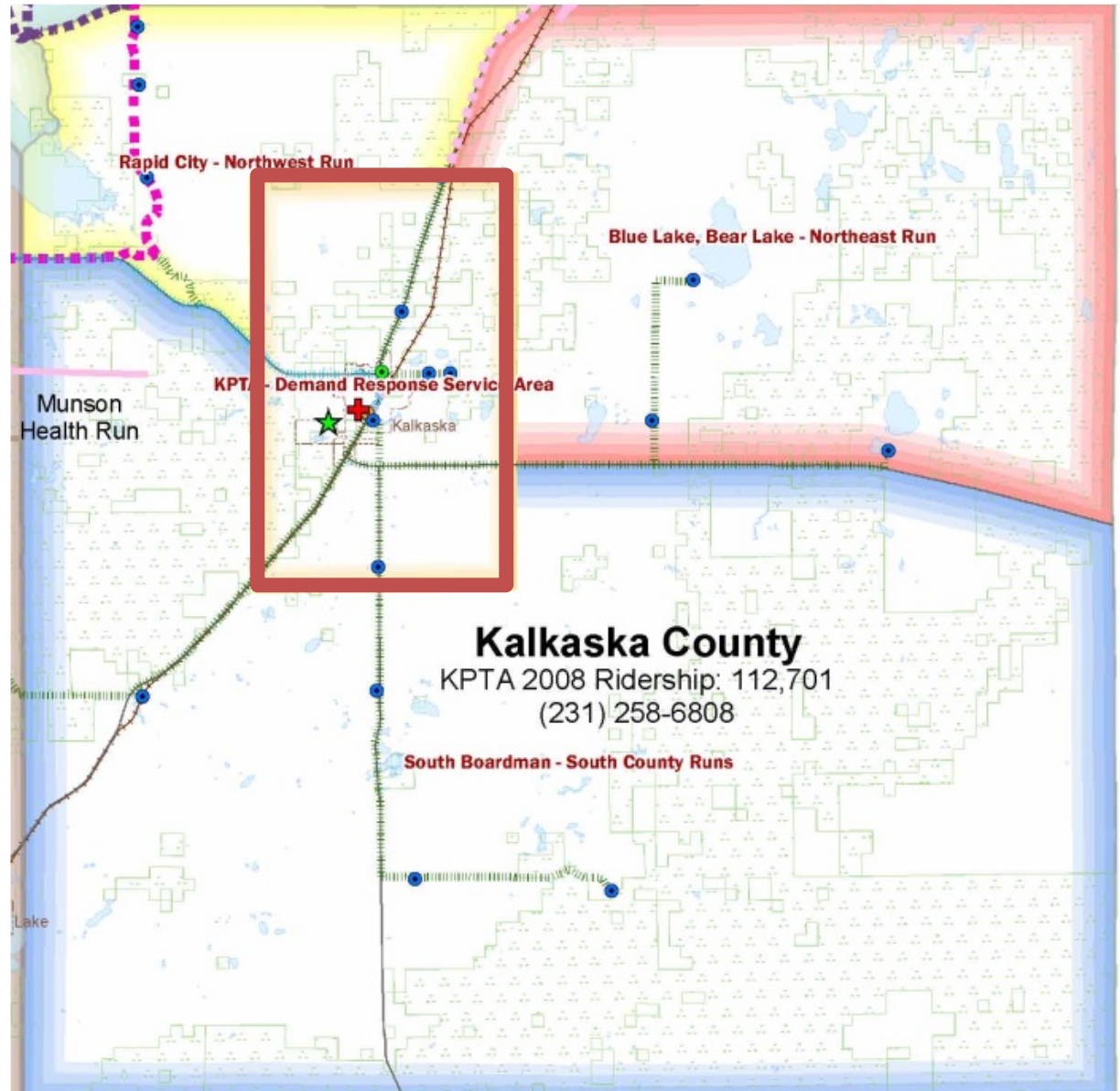
Map Provided By:



The six-county region comprising Antrim, Benzie, Grand Traverse, Kalkaska, Leelanau and Wexford is home to five public transit agencies. Public transit agencies not only provide on-demand service to commuters, the disabled, seniors and students, they also are large employers of professionalized staff; contributors to economic

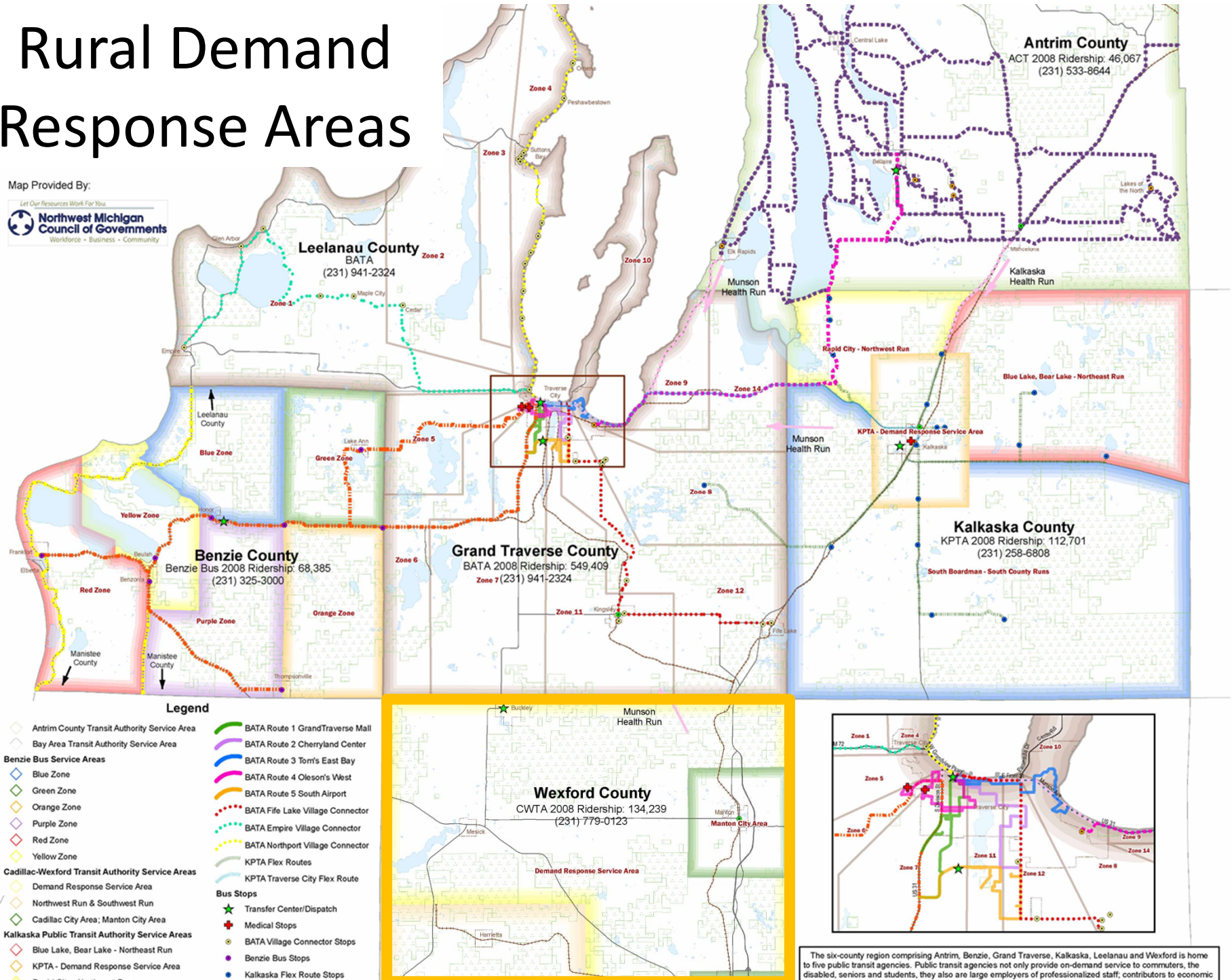
Urban Demand Response Circulator

- Outer zones served on a schedule (not true demand response)
- Kalkaska City served by demand response circulator
- Trip requests too infrequent for fixed route/fixed schedules, but frequent enough and short enough for true demand response



Rural Demand Response Areas

Map Provided By:



The map displays the CWTA Regional Passenger Transfer Site, marked by a yellow star at the top center. The site is located near the intersection of Wexford and Greenwood counties. The map also shows the Rural Scheduled Service Area, which includes the Mesick Area, Harrietta Area, Boon Area, and Cadillac Area. The map is color-coded: green for the transfer site, yellow for the rural service area, and blue for the demand response area. The map includes labels for various locations such as Mesick, Harrietta, Boon, and Cadillac, as well as major roads and water bodies.

Regional Transfer Site

Rural Scheduled Service Area
6 am, 10 am, 2 pm, 4 pm

Demand Response Area

CWTA Transit Facility

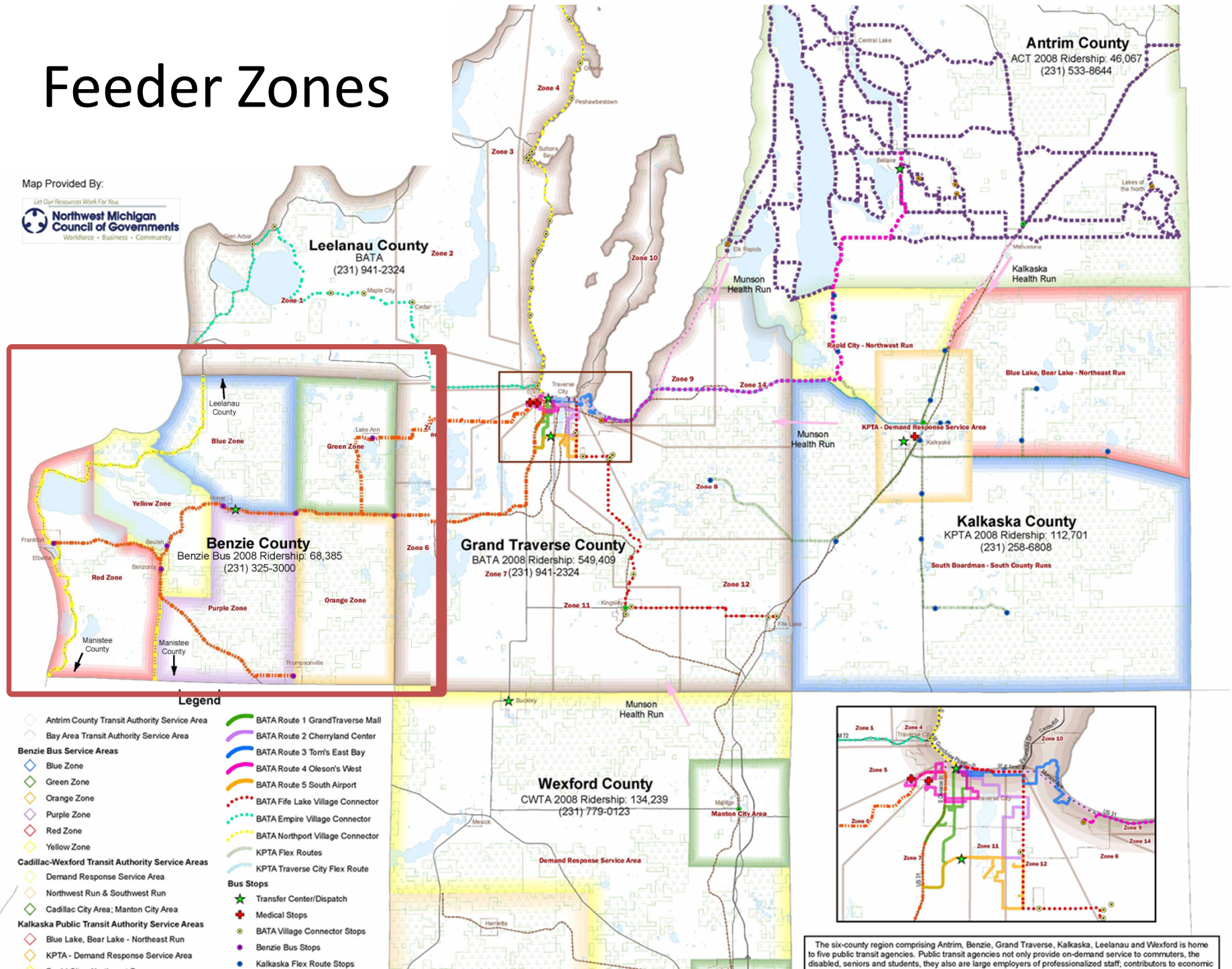
Rural Scheduled Service Area
6 am, 10 am, 2 pm, 4 pm

Demand
Response
Area

★ **CWTA Transit Facility**

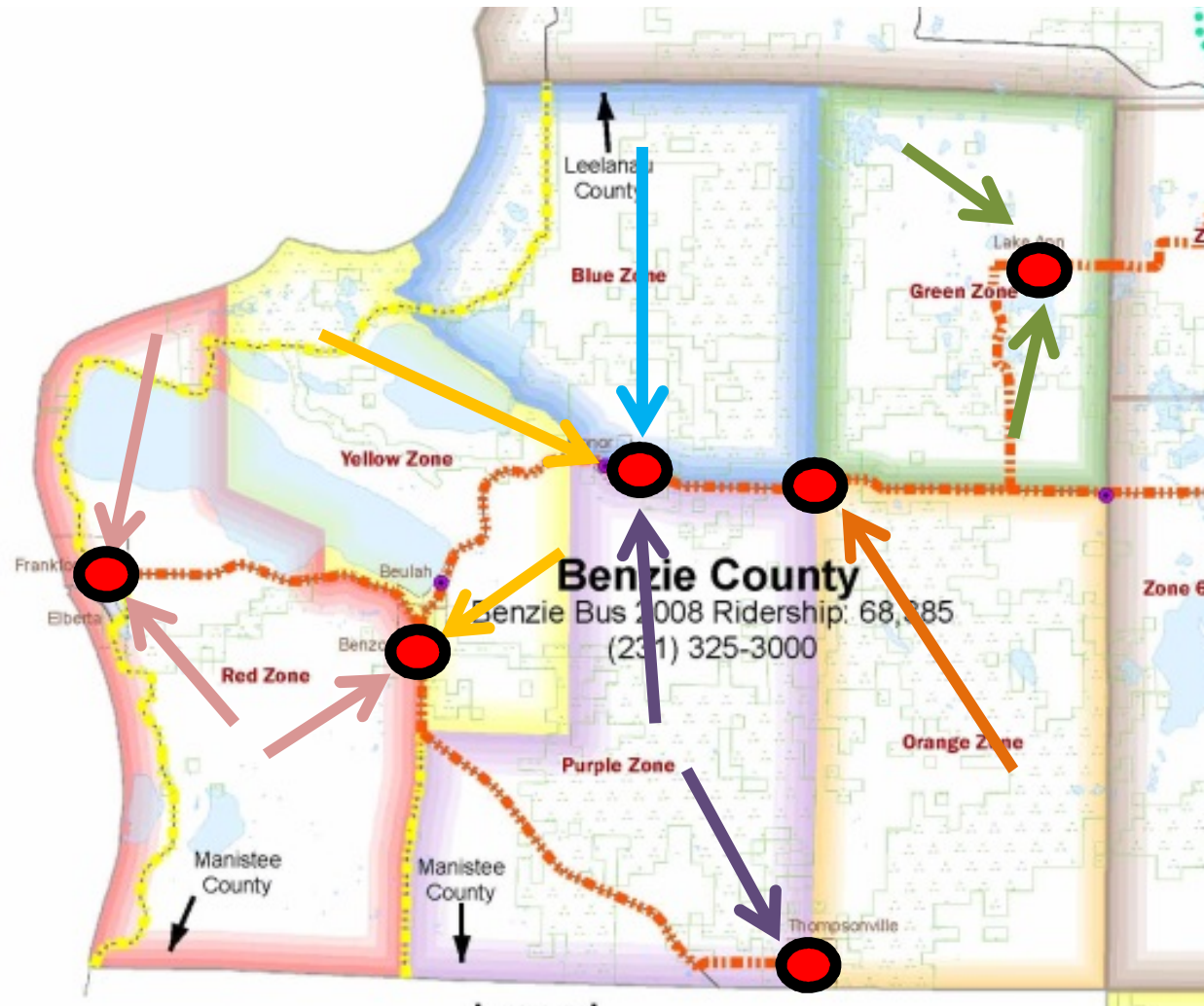
Feeder Zones

Map Provided By:



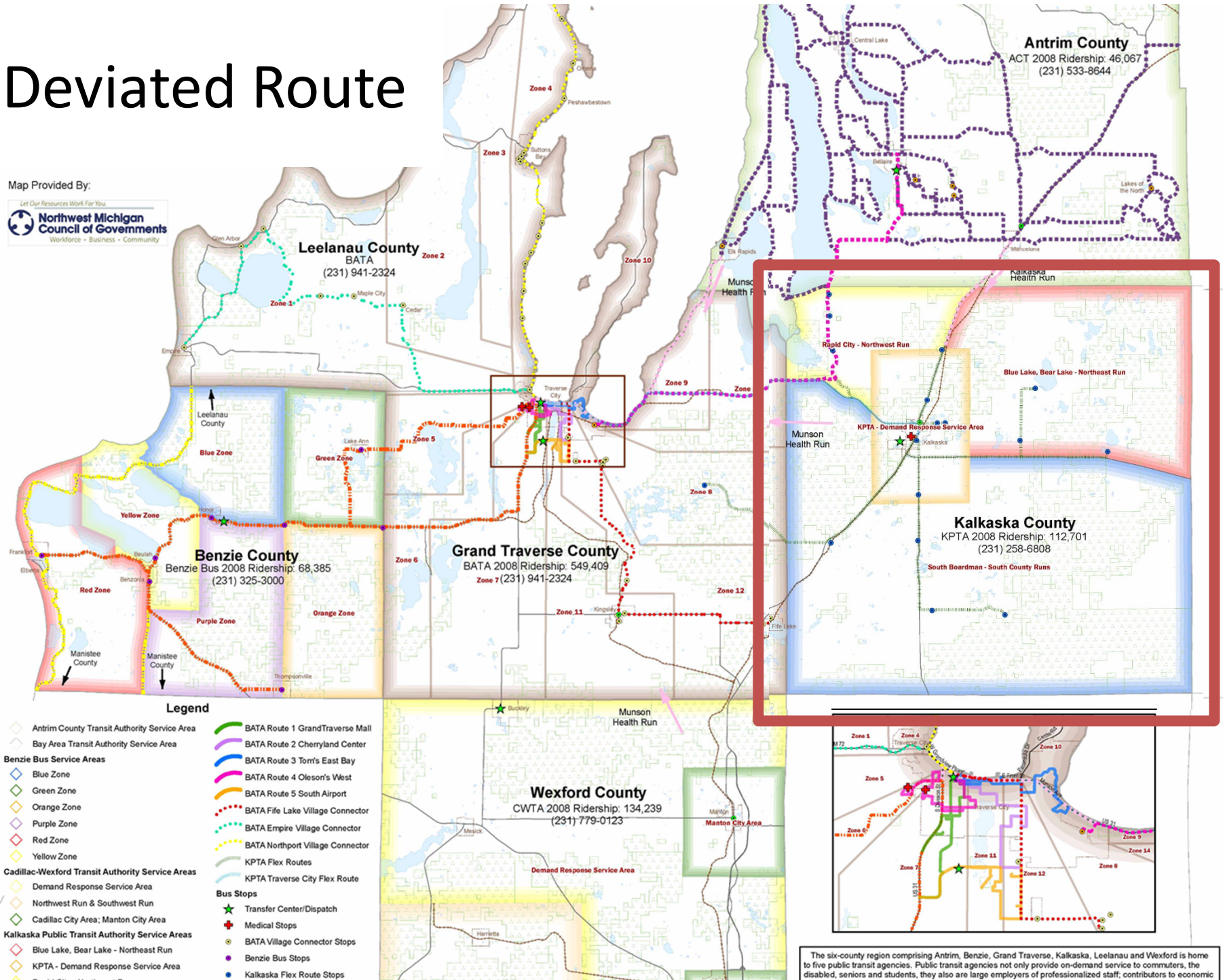
The six-county region comprising Antrim, Benzie, Grand Traverse, Kalkaska, Leelanau and Wexford is home to five public transit agencies. Public transit agencies not only provide on-demand service to commuters, the disabled, seniors and students, they also are large employers of professionalized staff; contributors to economic

Feeder Zones



Deviated Route

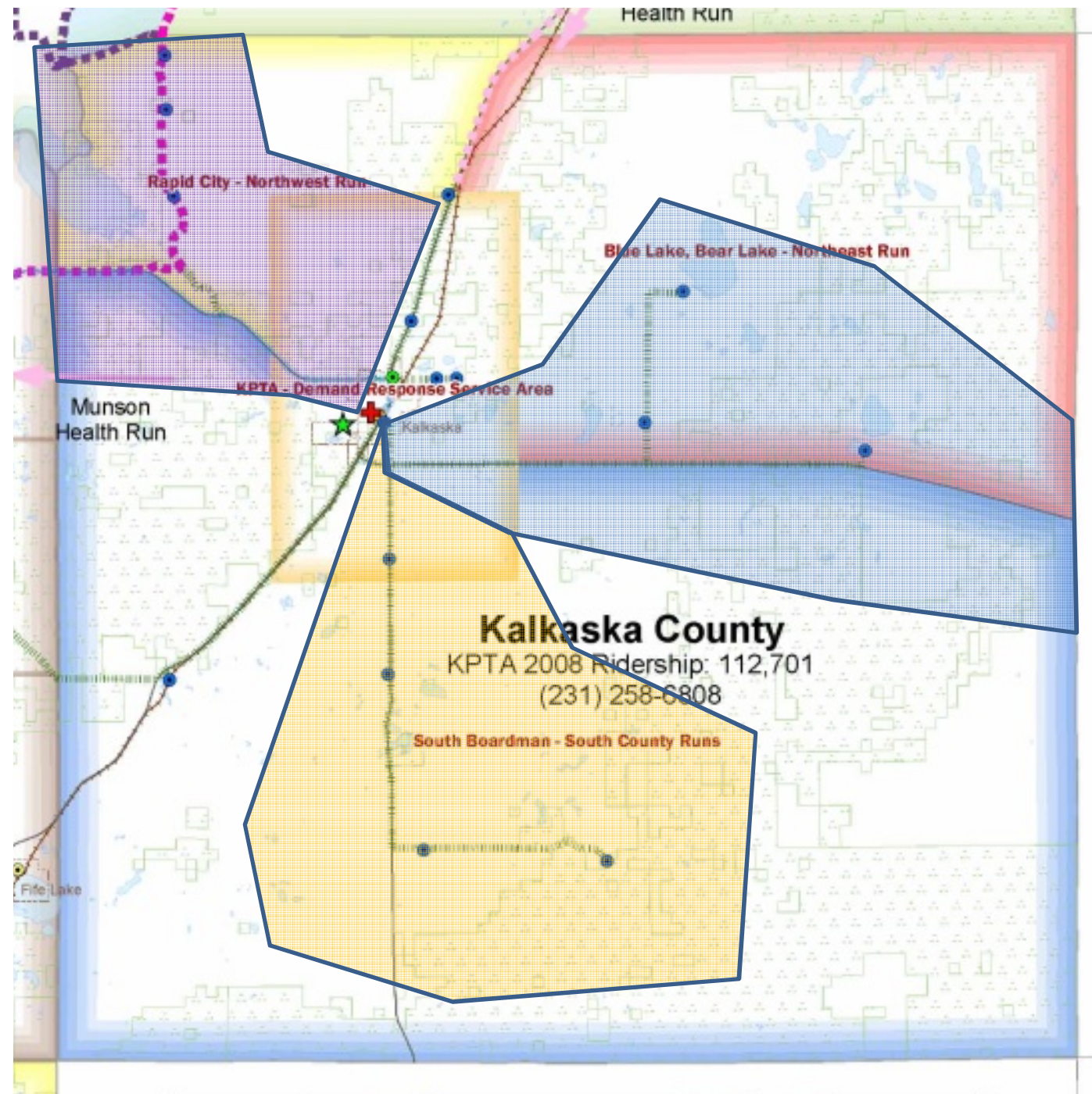
Map Provided By:



The six-county region comprising Antrim, Benzie, Grand Traverse, Kalkaska, Leelanau and Wexford is home to five public transit agencies. Public transit agencies not only provide on-demand service to commuters, the disabled, seniors and students, they also are large employers of professionalized staff; contributors to economic

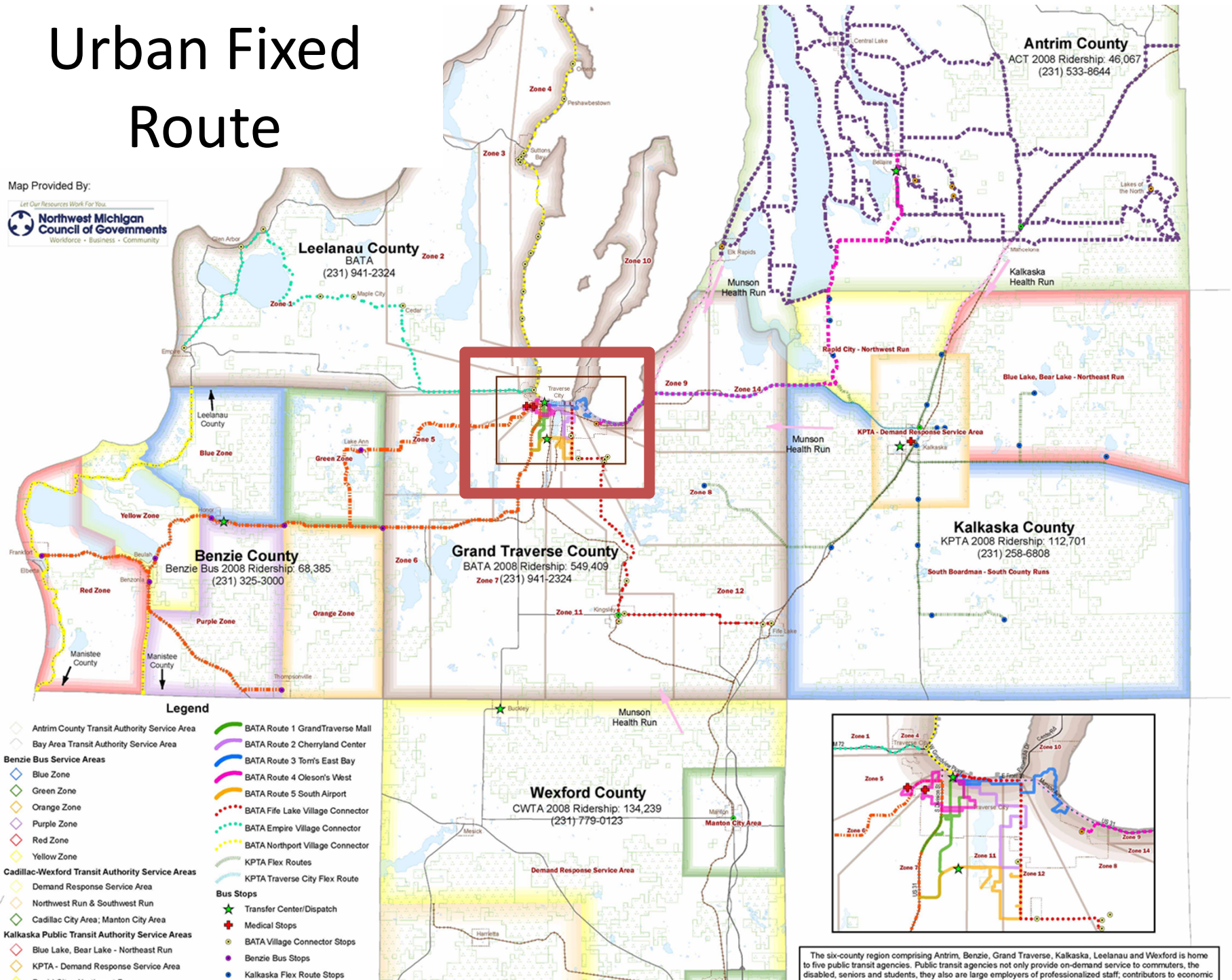
Deviated Route

Bear Lake/Blue Lake Manistee Lake Area	
Depart Kalkaska	10:00 a.m.
Depart Kalkaska	1:00 p.m.
Depart Kalkaska	5:00 p.m.
Rapid City/131 North Area	
Depart Kalkaska	8:45 a.m.
Depart Kalkaska	2:30 p.m.
Depart Kalkaska	5:15 p.m.
South Boardman/Fife Lake M-66 South Area	
Depart Kalkaska	7:45 a.m.
Depart Kalkaska	12:30 p.m.
Depart Kalkaska	3:30 p.m.



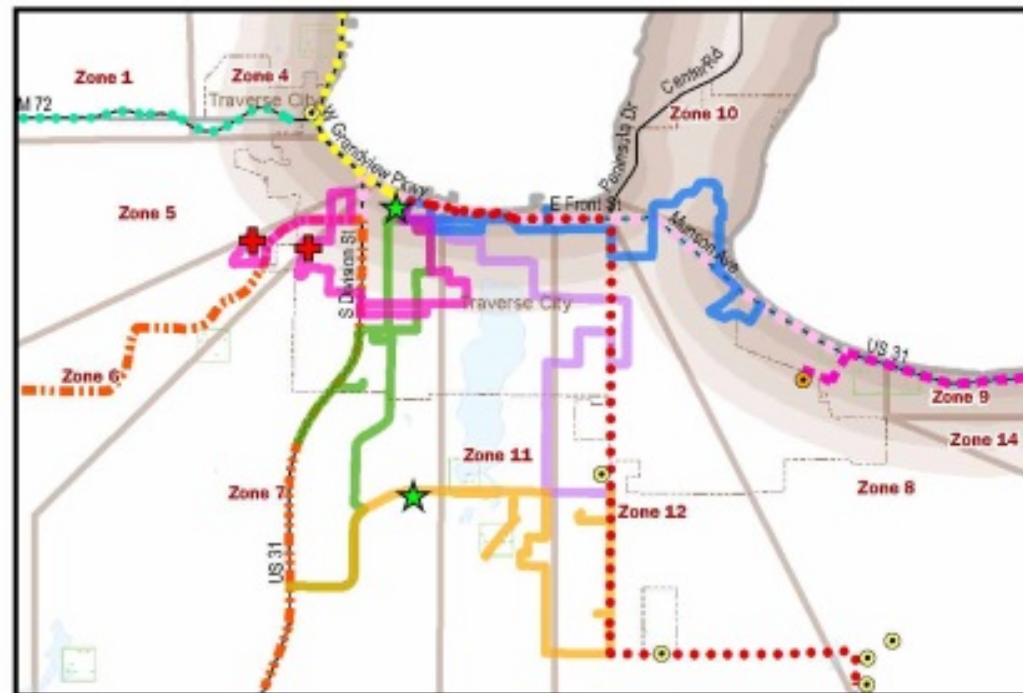
Urban Fixed Route

Map Provided By:

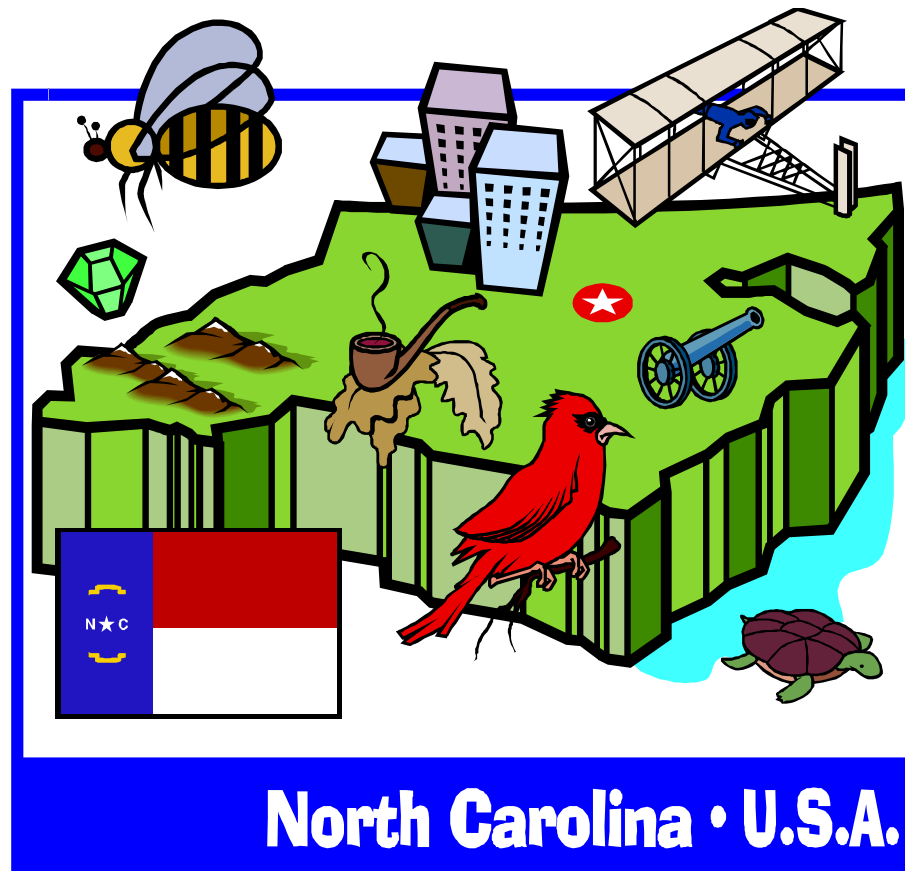


The six-county region comprising Antrim, Benzie, Grand Traverse, Kalkaska, Leelanau and Wexford is home to five public transit agencies. Public transit agencies not only provide on-demand service to commuters, the disabled, seniors and students, they also are large employers of professionalized staff; contributors to economic

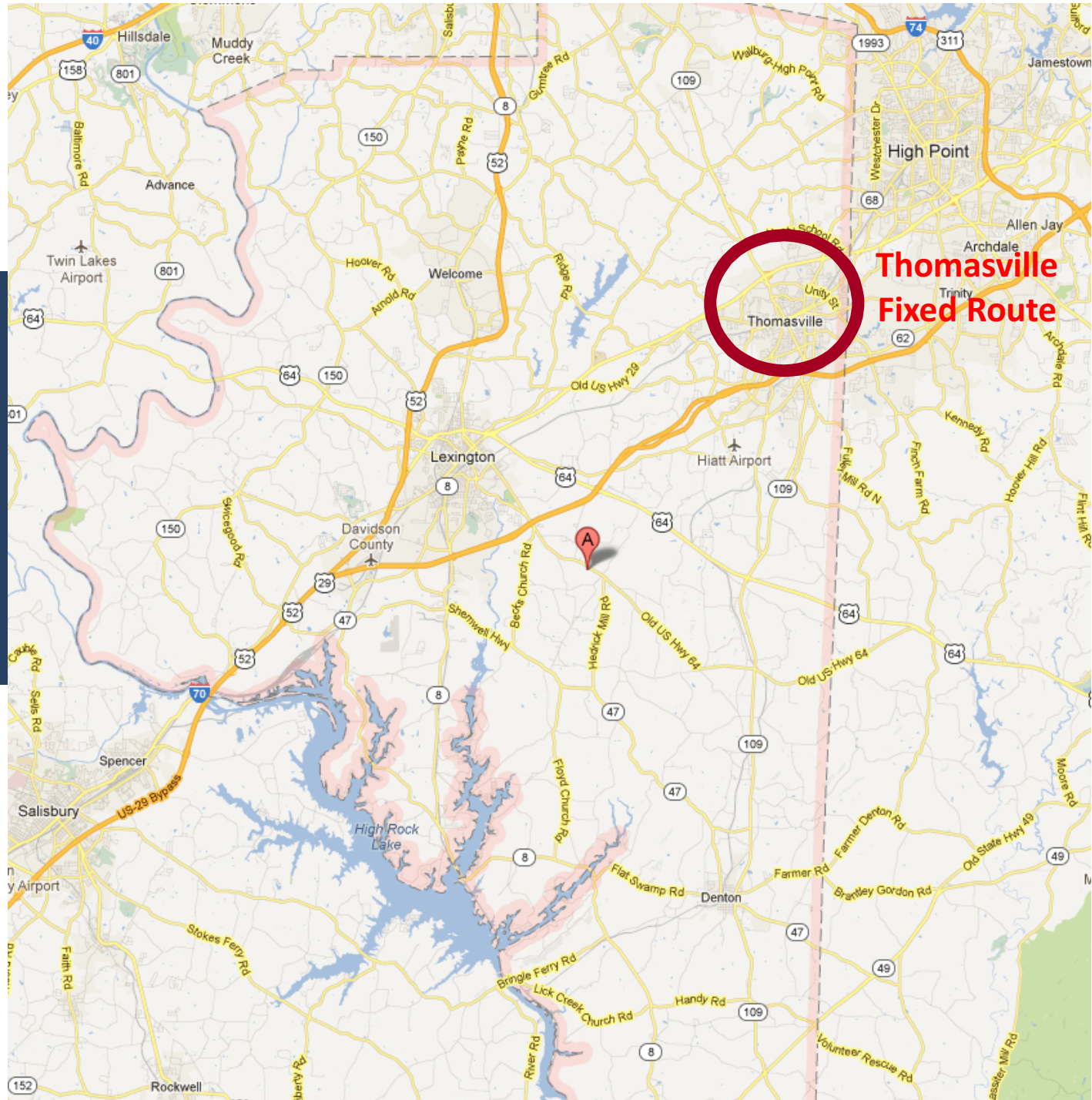
Urban Fixed Route



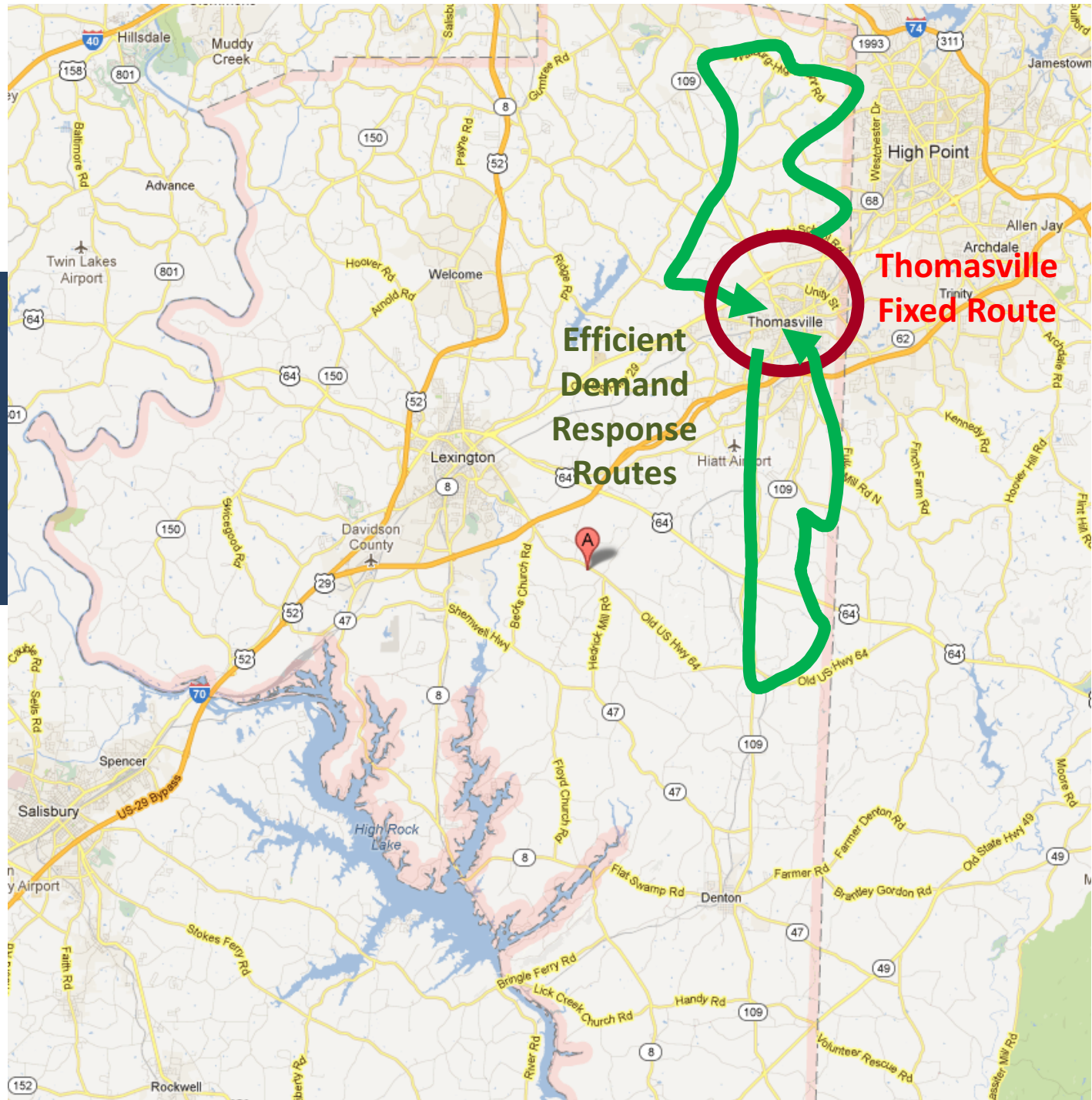
North Carolina Example



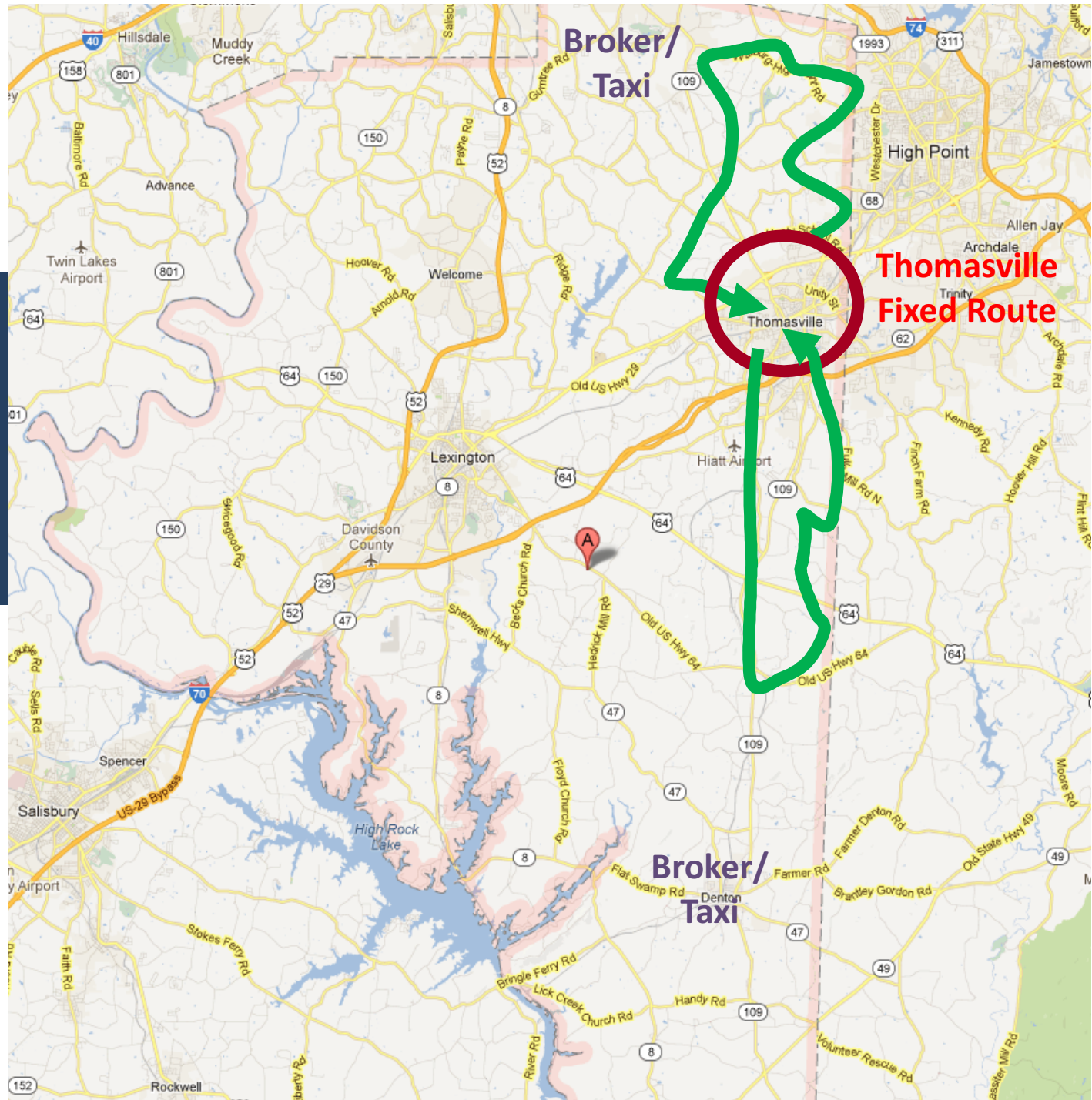
Step 1: Establish Core Structure - 2010



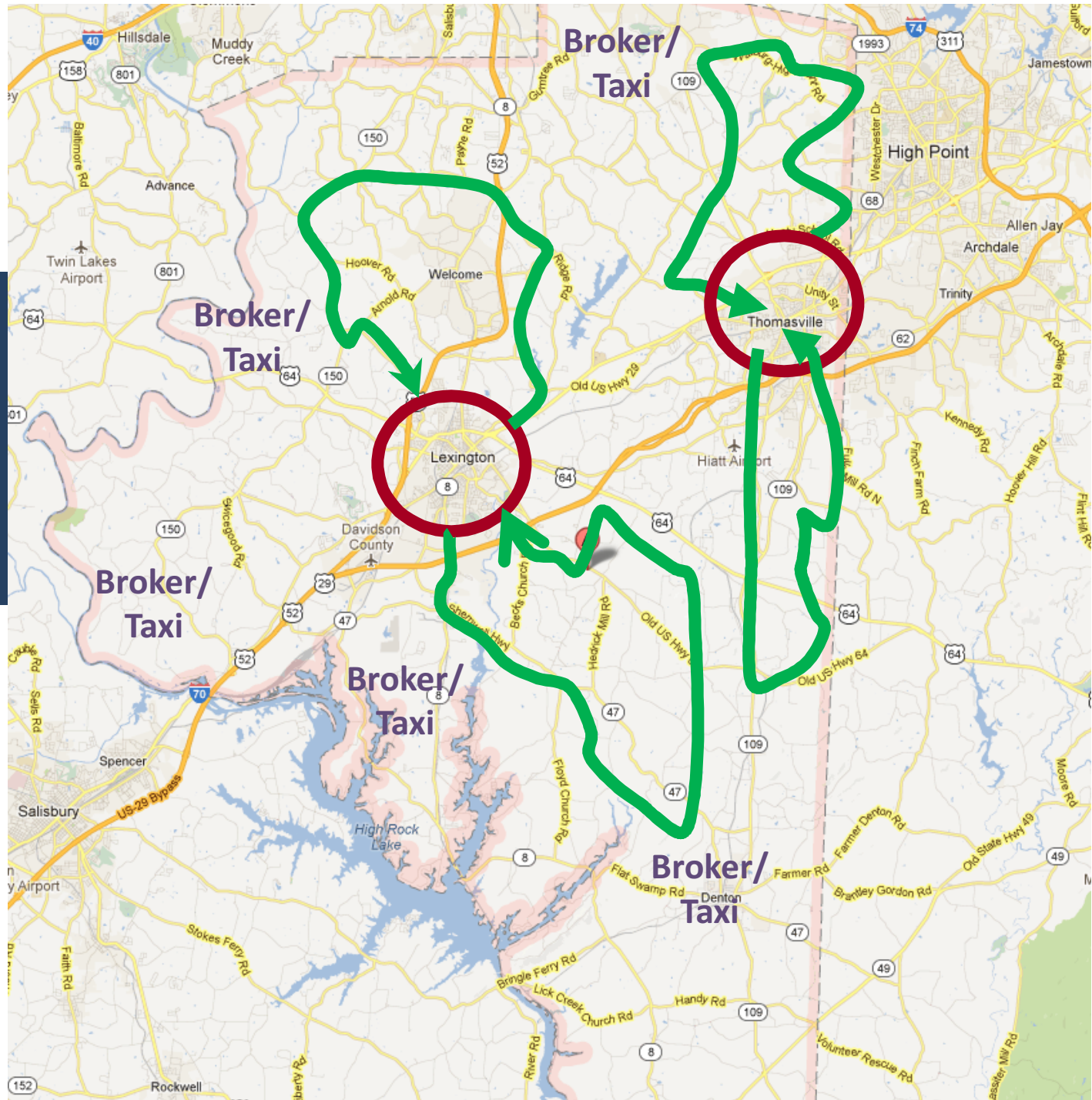
Step 2: Build Off the Core- 2010



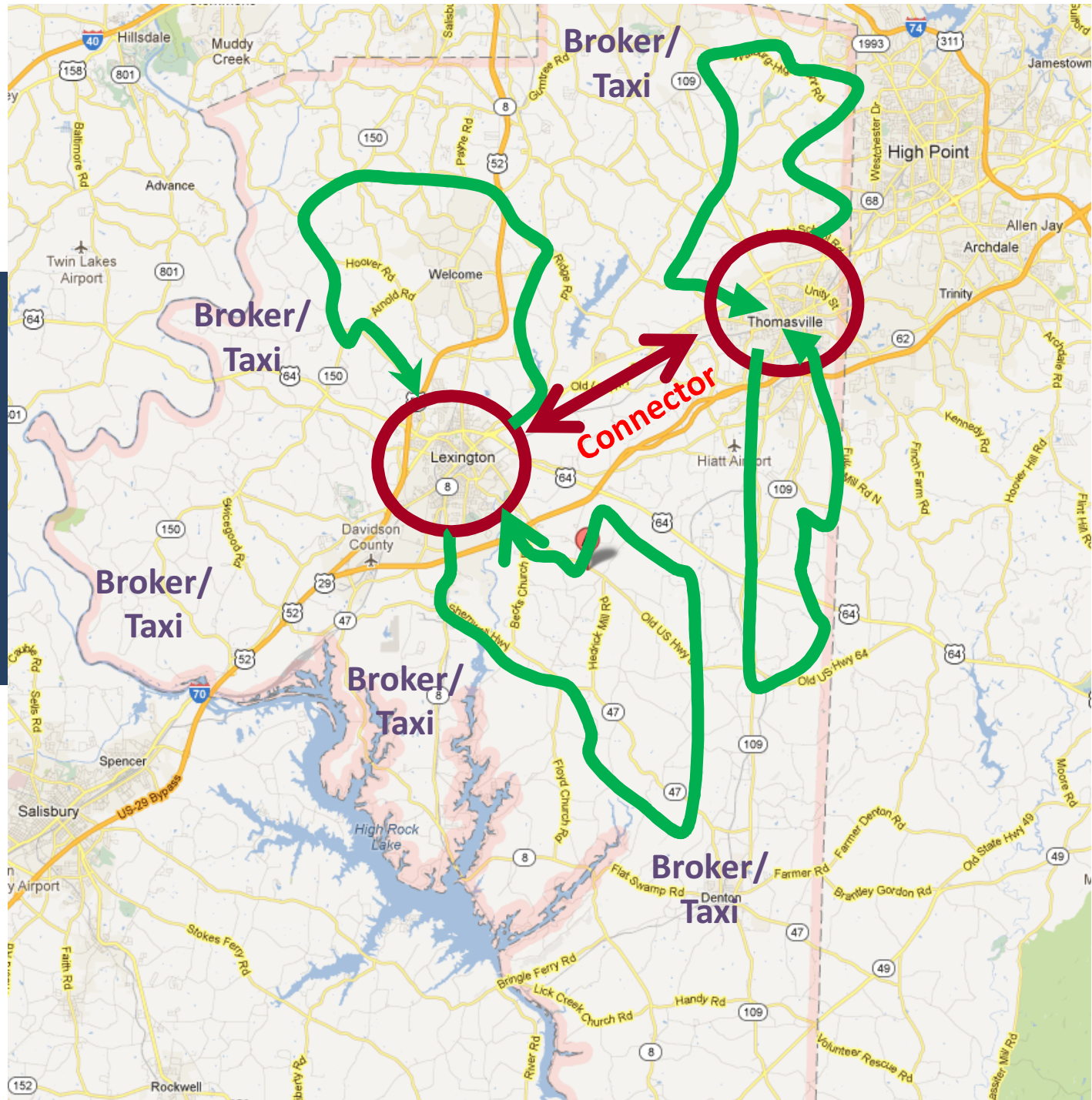
Step 3:
Focus on
Efficiency
- 2011



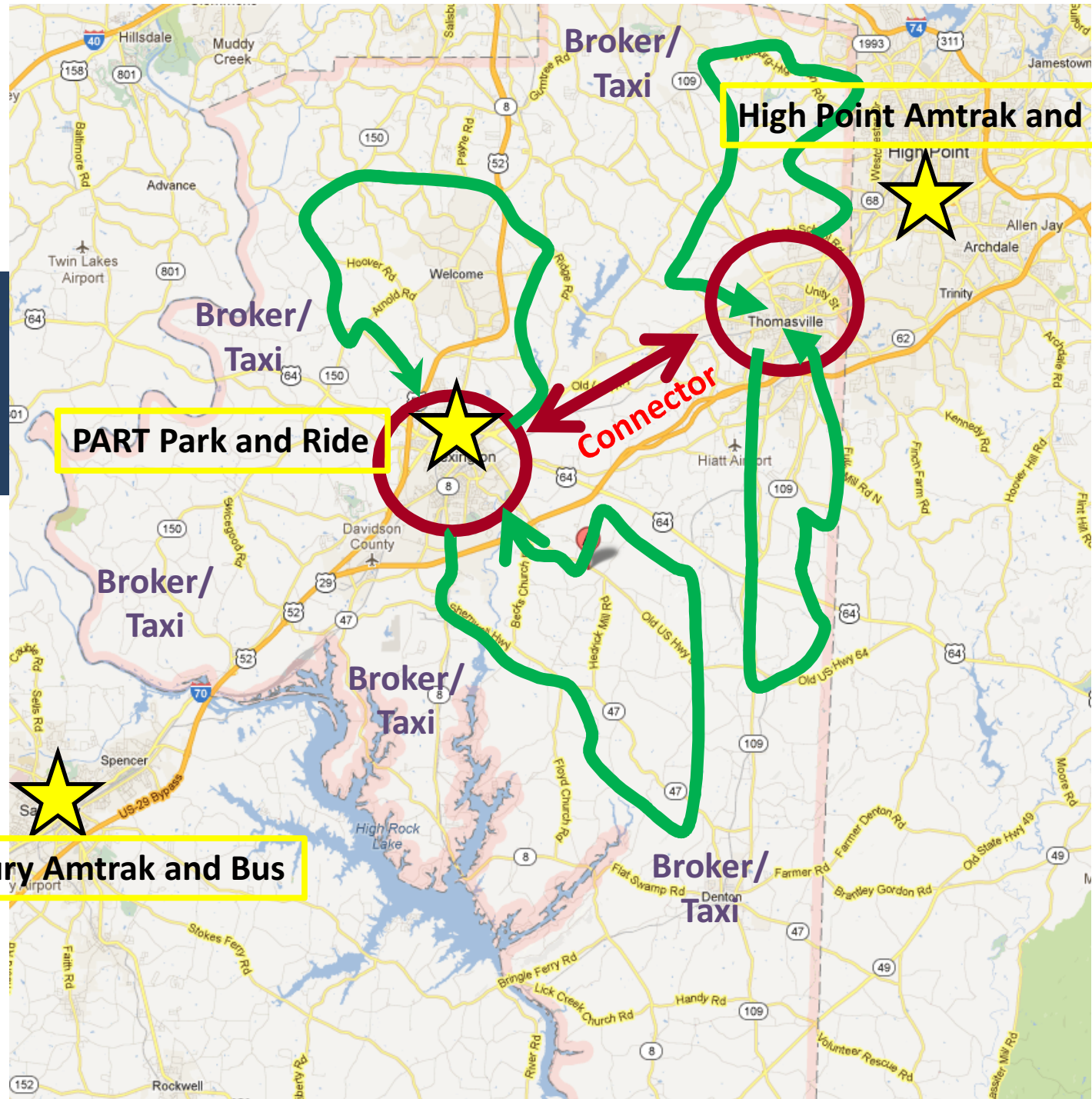
Step 4: Expand Core- 2012



Step 5: Create a Transit Network- 2012

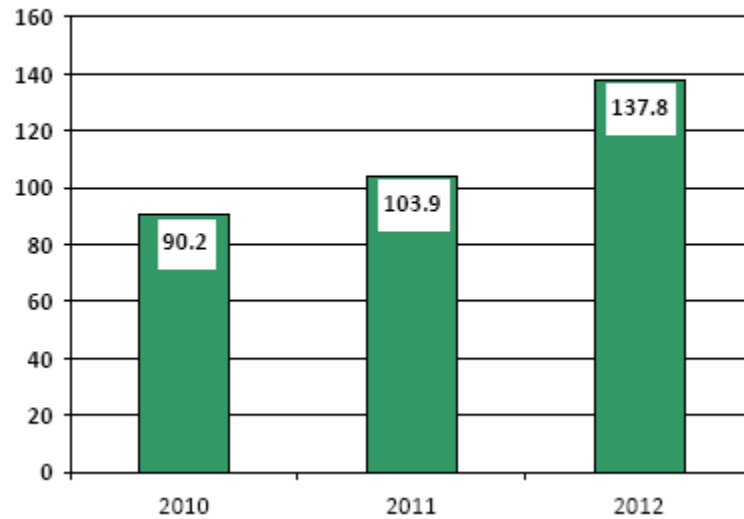


Step 6:
Regional
Integration



Reap the Benefits

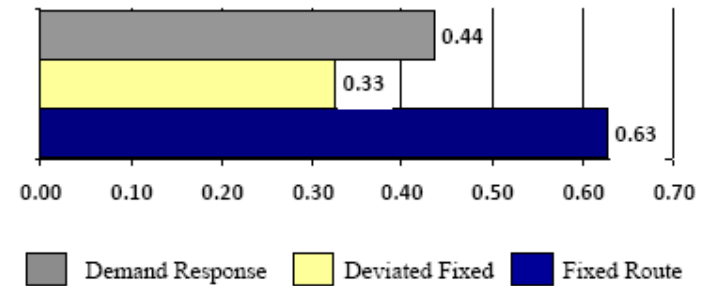
Passengers By Year in Thousands



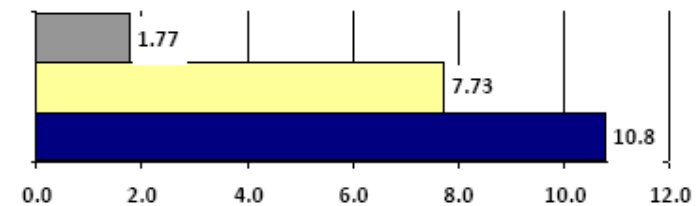
Cost Per Trip By Year



Efficiency By Mode
Passengers Per Mile



Passengers Per Hour



Innovative Service Design



Kai Monast

Institute for Transportation Research and Education

kcmonast@ncsu.edu (919) 515-8768